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EXAMINER

MULLINS, BURTON S

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 04/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/970,105

Applicant(s)

REITER ET AL.

Examiner

Burton S. Mullins

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 13 January 2003.

2a) ☐ This action is FINAL.

2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-70 is/are pending in the application.

4a) Of the above claim(s) 45-70 is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-13, 15-28 and 31-44 is/are rejected.

7) ☒ Claim(s) 14, 29 and 30 is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 45-70 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Election was made **without** traverse in the response filed 13 January 2003.

Claim Rejections - 35 USC § 112

2. Claims 32-44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 32-33, recitations "...optionally filling a plurality of third portions in the outer annular region of the die with a non-ferromagnetic powder metal" and "with optional intermediate magnetically non-conducting bridge segments" are vague and indefinite. It is not clear if this means that third portions filled with non-ferromagnetic powder metal and bridge segments are included in the product or not. Presumably, they need not be.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 5, 7, 9, 11, 13, 15, 18, 20, 22, 24, 26, 32, 34-35, 37, 39 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Hosoda et al. (JP 8-340666). Hosoda

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teaches a method of making a powder metal rotor for a circumferential type interior permanent magnet machine (Figs.1&6), the method comprising: filling a plurality of discrete first regions 20 within an outer annular region of a disk-shaped die 1 (Figs.2a-2b) with a non-ferromagnetic powder metal so as to leave spaces between each discrete first region (translation ¶23&25; Figs.1,2a-2b& 6); filling a plurality of discrete second regions 19 in the outer annular region between the first regions with a soft ferromagnetic (e.g., Permalloy) powder metal so as to maintain a radially inner circumferentially extending space between each discrete first region (translation ¶22&25; Figs.1,2a-2b& 6); pressing the powders in the die to form a compacted powder metal disk (translation ¶24-¶28); sintering the compacted powder metal disk (translation ¶25 & ¶28); and providing permanent magnets in the radially inner circumferentially extending spaces between the discrete first regions of the outer annular region in an arrangement of alternating polarity (translation ¶23 & ¶24) to form a composite powder metal disk having a plurality of alternating polarity permanent magnets 21 separated by magnetically non-conducting barrier segments 20 and radially embedded by magnetically conducting segments 19 (Figs.1& 6).

Regarding claim 2, the region of through hole area 2, between magnets 21 and shaft hole 6, is filled with an inner annular magnetically conducting segment.

Regarding claims 3 and 16, the method includes filling the regions concurrently to form an "integrated" product (¶17).

Regarding claims 5 and 18, providing permanent magnets as described ¶23 & ¶24 would inherently include affixing them to the barrier segments 20.

Regarding claims 7 and 20, Permalloy is an alloy of Ni and Fe.

Regarding claims 9, 22 and 37, the non-ferromagnetic powder may comprise an austenite stainless steel powder (¶21).

Regarding claims 11, 24 and 39, the pressing step comprises uniaxially pressing the powders in the die, i.e., the powders are compressed axially along one axis.

Regarding claims 13, 26 and 41, after pressing, the compacted powder metal disk is delubricated at a first temperature, followed by sintering at a second temperature (1,220° C) greater than the first temperature (¶25).

Regarding claim 32, since the "plurality of third portions in the outer annular region of the die with a non-ferromagnetic powder metal" and "intermediate magnetically non-conducting bridge segments" are "optional", the claims when given the broadest reasonable interpretation, are met by Hosoda.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4, 6, 10, 17, 19, 23 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoda et al. Although Hosoda does not teach sequential filling of the powder (claims 4 and 17), this would have been an obvious matter of engineering design since applicant provides no criticality regarding this feature and since the sequential filling would not

result in a different product from that of Hosoda. Regarding claims 6 and 19, though Hosoda does not teach filling the radially inner circumferentially extending spaces with a hard ferromagnetic powder metal, per se, this would have involved obvious engineering design changes since it is well known to provide hard or soft powders depending on the desired coercivity of the product. Regarding claims 10, 23 and 38, though Hosoda does not teach an AISI 8000 series steel powder, it would have been an obvious matter of engineering design to provide this well-known powder for the non-ferromagnetic metal in Hosoda.

7. Claims 8, 21 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoda in view of Achikita et al. (US 5,091,022). Hosoda does not teach that the soft ferromagnetic powder metal is a high purity iron powder with a minor addition of phosphorus.

Achikita teaches a soft ferromagnetic powder comprising Fe and P with uniform distribution and excellent soft magnetic characteristics (c.1, lines 56+).

It would have been obvious to employ a soft ferromagnetic powder with Fe and P per Achikita in Hosoda since this would have been desirable to provide uniform distribution and excellent soft magnetic characteristics.

8. Claims 12, 25 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoda in view of Young (US 5,701,943). Hosoda does not teach pre-heating the powders and pre-heating the die.

Young teaches a die for forming metal matrix composites from a blended powder including the steps of pre-heating the die and powders so that the metal matrix material remains molten for long enough to apply pressure and achieve the disruption of the discrete globules (c.2, lines 4-12 and 20-26).

It would have been obvious to pre-heat the powder and die per Young in the method of Hosoda since this would have been desirable to disrupt the discrete globules of powder.

9. Claims 27 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoda in view of Gazza (US 3,864,154). Hosoda does not teach that the sintering is performed in a vacuum furnace having a controlled atmosphere.

Gazza teaches a sintering method for powdered aluminum material wherein the sintering takes place in a vacuum furnace under controlled atmospheres to achieve infiltration (c.1, line 60-c.2 line 2).

It would have been obvious to perform the sintering of Hosoda in a vacuum furnace having a controlled atmosphere per Gazza since this would have been desirable to achieve infiltration.

10. Claims 28 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoda in view of Madsac (US 4,713,215). Hosoda does not teach that the sintering is performed in a belt furnace having a controlled atmosphere.

Madsac teaches a sintering method for powdered material wherein the sintering takes place in a continuous furnace under controlled atmospheres to maintain the reducing character of the atmosphere and reduce oxidation (c.1, lines 12-34).

It would have been obvious to perform the sintering of Hosoda in a belt furnace having a controlled atmosphere per Madsac since this would have been desirable to maintain the reducing character of the atmosphere and reduce oxidation.

11. Claims 31 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosoda in view of Uchida (US 5,010,266). Hosoda does not teach plural metal disks.

Uchida teaches a synchronous motor comprising plural rotor elements 34a/34b connected together axially and shifted radially by an angle to reduce cogging.

It would have been obvious to provide plural metal disks per Uchida using the disks of Hosoda since this would have enabled offset of the rotor sections, thereby reducing cogging.

Allowable Subject Matter


12. Claims 14 and 29-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Hosoda does not teach a method further comprising filling the discrete second regions so as to further maintain a radially extending unfilled region through each discrete second region and filling the radially extending unfilled regions with a non-ferromagnetic powder metal, pressing the non-ferromagnetic powder metal, and sintering the pressed powder to form intermediate magnetically non-conducting bridge segments in the magnetically conducting segments; or a method further comprising filling a portion of the inner annular region in a desired pattern with a non-ferromagnetic powder metal, pressing the nonferromagnetic powder metal, and sintering the pressed powder to form an inner magnetically non-conducting insert (claim 30). Hosoda's inner annular region appears to comprise a ferromagnetic powder metal.

13. Claim 33 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims. Hosoda does not teach the steps further including, after the second sintering step, filling the fourth portions with a hard

ferromagnetic powder metal, pressing the hard ferromagnetic powder metal in the die to form a plurality of compacted permanent magnet segments, and sintering the compacted permanent magnet segments and the compacted and sintered inner annular and outer conducting segments and magnetically non-conducting barrier and 'optional' [sic] bridge segments.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Burton S. Mullins whose telephone number is 305-7063. The examiner can normally be reached on Monday-Friday, 9 am to 5 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 308-1371. The fax phone numbers for the organization where this application or proceeding is assigned are 305-1341 for regular communications and 305-1341 for After Final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0956.


BURTON S. MULLINS
PRIMARY EXAMINER